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Abstract

ALTIMETRY OF THE AMAZON BASIN RIVERS

Joecila Santos da Silva¹; Stéphane Calmant²; Frédérique Seyler³; Achilles Monteiro⁴; Daniel Medeiros Moreira⁴ and RHASA Team⁵

1 Universidade do Estado do Amazonas – UEA; Centro de Estudos Superiores do Trópico Úmido – CESTU; Av. Djalma Batista 3578, Flores, 69050-010, Manaus-AM, Brasil; e-mail: jsdsilva@uea.edu.br

2 Institut de Recherche pour le Développement – IRD, UMR 5566 LEGOS CNES/CNRS/IRD/UT3; 14 av. Edouard Belin, 31400, Toulouse, France; e-mail: stephane.calmant@ird.fr

3 Institut de Recherche pour le Développement – IRD, UMR ESPACE-DEV; 500 rue Jean François Breton, 34093, Montpellier Cedex 5, France; email: frederique.seyler@ird.fr

4 Serviço Geológico do Brasil – CPRM; Av. Pasteur 404, Urca, 22290-040, Rio de Janeiro – RJ, Brasil; e-mail: achiles.monteiro@cprm.gov.br; daniel.moreira@cprm.gov.br

5 Universidade do Estado do Amazonas – UEA, Escola Superior de Tecnologia – EST, Av. Darcy Vargas, 1200, 69065-020, Manaus - AM, Brasil, e-mail: alinecorrea.acs@gmail.com; debora.gusmao13@gmail.com; frank.meteoro@gmail.com; guilhermecordeiro_f@hotmail.com; kleitonmorais@hotmail.com; vergastinha@gmail.com; luisadefreitas@hotmail.com; apPhillipe@gmail.com; robsonaz@ig.com.br; conchynha@live.com

Altimetry of rivers all along their course is major information in hydrology, whatever it is for running hydrological model, determine the amount of surface water stored, and predict the consequences of extreme events. Satellite altimetry can be used in many ways to retrieve consistent altimetry information throughout the course of rivers. Now, it is now well known as a useful tool to retrieve the space and time variations of the water surface. Besides this basic use of satellite altimetry, it can also be used to: 1/ level gauges, so making a consistent dataset merging high temporal sampling from gauges and dense sampling from the crossings between satellite tracks and river network; 2/ densify climatic series (mean value per month of the year) all along the river course when series are long enough and, by comparison with time series, evidence extreme events; 3/ detail the altitudinal changes of the river course which, when compared to a DTM, inform over the basin hypsometry; 4/ level bathymetric profiles in order to obtain altitudinal changes of the river bed; 4/check for errors in the gauge series or in the metadata information related to a gauge; 5/ time series with a one-day sampling period. In the present study, we present examples of such applications of satellite altimetry for the major contributors of the Amazon basins. In this basin, more than 1000 series have been computed from the ERS2 & ENVISAT missions in the one hand (1995-2010) and from the T/P & JASON2 missions in the other hand (1992-2002 / 2008-). All series have been carefully checked manually and we present statistics of comparison with ground-truth, i.e. water levels from GPS-leveled gauges. Rivers of very different widths have been sampled, ranging from several km wide to less than 100m wide. For some of the rivers, altimetry series are the only possibility to get stage and slope information since these rivers are devoid of in-situ measurement or the measurements are not available, in particular out of Brazil.